

## EXPERIMENTAL RESULTS:

### 1. Class Priors

$P(\Omega = 1) = 0.0426$   
 $P(\Omega = 2) = 0.0516$   
 $P(\Omega = 3) = 0.0508$   
 $P(\Omega = 4) = 0.0521$   
 $P(\Omega = 5) = 0.051$   
 $P(\Omega = 6) = 0.0525$   
 $P(\Omega = 7) = 0.0516$   
 $P(\Omega = 8) = 0.0525$   
 $P(\Omega = 9) = 0.0529$   
 $P(\Omega = 10) = 0.0527$   
 $P(\Omega = 11) = 0.0531$   
 $P(\Omega = 12) = 0.0527$   
 $P(\Omega = 13) = 0.0524$   
 $P(\Omega = 14) = 0.0527$   
 $P(\Omega = 15) = 0.0526$   
 $P(\Omega = 16) = 0.0532$   
 $P(\Omega = 17) = 0.0484$   
 $P(\Omega = 18) = 0.05$   
 $P(\Omega = 19) = 0.0412$   
 $P(\Omega = 20) = 0.0334$

### 2. Results based on Bayesian Estimator

#### 2.1. Training Data on Bayesian Estimator

Overall Accuracy = 0.9481764131688704

Class Accuracy:

Group 1 : 0.98125  
Group 2 : 0.9242685025817556  
Group 3 : 0.8916083916083916  
Group 4 : 0.9318568994889267  
Group 5 : 0.9547826086956521  
Group 6 : 0.9408783783783784  
Group 7 : 0.8127147766323024  
Group 8 : 0.9628378378378378  
Group 9 : 0.9714765100671141  
Group 10 : 0.9747474747474747  
Group 11 : 0.9782608695652174

Group 12 : 0.9814814814814815  
 Group 13 : 0.9323181049069373  
 Group 14 : 0.9764309764309764  
 Group 15 : 0.9814502529510961  
 Group 16 : 0.9849749582637729  
 Group 17 : 0.9889908256880734  
 Group 18 : 0.9716312056737588  
 Group 19 : 0.9676724137931034  
 Group 20 : 0.8138297872340425

Confusion Matrix:

471	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	1	2
0	537	6	15	1	11	2	1	1	0	0	2	1	0	3	1	0	0	0	0	0
1	10	510	23	0	18	2	0	0	0	0	3	1	1	0	2	0	0	1	0	0
0	12	4	547	3	5	6	0	0	0	0	2	3	0	1	1	1	1	1	1	0
1	4	2	5	549	2	0	0	2	0	0	2	1	3	1	1	0	0	2	0	0
1	12	8	4	2	557	0	0	1	1	0	1	0	0	2	1	1	0	1	0	0
1	4	0	30	6	1	473	20	1	3	3	10	13	3	1	3	5	1	4	0	0
1	0	0	2	1	2	3	570	1	1	0	1	1	1	0	1	2	0	4	1	0
1	1	0	1	1	0	4	2	579	0	0	0	0	2	0	2	2	0	1	0	0
0	3	0	1	0	1	1	2	0	579	4	0	1	1	0	0	1	0	0	0	0
1	0	1	2	0	0	0	2	0	0	585	1	1	0	0	1	0	1	3	0	0
0	2	0	0	0	0	0	0	0	0	0	583	0	1	0	0	2	0	6	0	0
0	4	1	14	3	0	3	1	0	0	1	4	551	2	2	1	2	0	2	0	0
0	1	0	0	0	1	0	1	1	0	0	1	2	580	1	4	2	0	0	0	0
1	1	0	1	0	2	0	1	0	0	0	1	1	1	582	1	0	0	1	0	0
0	2	0	1	0	0	0	0	0	0	0	0	1	0	590	2	2	1	0	0	0
0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2	539	0	2	0	0
0	1	0	0	0	0	0	1	0	0	0	1	0	2	0	7	0	548	4	0	0
2	2	0	0	0	1	0	0	0	0	0	3	0	1	0	0	4	2	449	0	0
19	1	0	0	0	1	0	0	1	0	0	0	0	0	1	28	13	4	2	306	0

## 2.2. Test Data on Bayesian Estimator

Overall Accuracy = 0.950033311125916

Class Accuracy:

Group 1 : 0.9716981132075472  
 Group 2 : 0.9794344473007712  
 Group 3 : 0.8951406649616368

Group 4 : 0.9413265306122449  
Group 5 : 0.9451697127937336  
Group 6 : 0.9333333333333333  
Group 7 : 0.8429319371727748  
Group 8 : 0.9696202531645569  
Group 9 : 0.9874055415617129  
Group 10 : 0.9848866498740554  
Group 11 : 0.9899749373433584  
Group 12 : 0.979746835443038  
Group 13 : 0.9287531806615776  
Group 14 : 0.9694656488549618  
Group 15 : 0.9540816326530612  
Group 16 : 0.9849246231155779  
Group 17 : 0.967032967032967  
Group 18 : 0.9707446808510638  
Group 19 : 0.9612903225806452  
Group 20 : 0.7888446215139442

Confusion Matrix:

309	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	1	0	0	2
1	381	2	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
0	18	350	9	1	5	0	0	0	1	1	0	0	0	1	1	1	1	0	2	1
1	11	4	369	1	3	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0
0	5	2	8	362	0	2	0	0	0	0	3	1	0	0	0	0	0	0	0	0
0	19	1	1	0	364	0	0	0	0	1	1	0	0	1	0	0	1	1	0	0
1	7	1	19	6	4	322	8	1	2	0	1	3	0	2	0	3	0	2	0	0
0	1	0	0	0	0	3	383	1	0	0	1	0	0	0	1	2	0	3	0	0
0	1	1	0	0	0	0	2	392	0	0	0	0	0	0	1	0	0	0	0	0
0	6	0	0	0	0	0	0	0	391	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	2	395	0	0	0	0	1	0	0	0	0	0
0	5	0	0	0	0	0	0	0	0	0	387	0	0	0	0	1	0	2	0	0
0	16	0	5	1	1	1	0	0	1	0	1	365	0	1	1	0	0	0	0	0
2	4	0	0	0	0	0	1	0	0	0	1	2	381	0	1	1	0	0	0	0
0	13	0	0	0	0	0	0	0	1	0	1	0	2	374	0	0	1	0	0	0
1	2	0	0	1	0	0	0	0	0	0	0	0	1	0	392	0	0	1	0	0
2	0	0	0	0	1	0	0	1	1	0	2	0	0	0	2	352	1	2	0	0
2	1	0	0	0	0	0	1	1	1	0	0	0	0	0	2	2	365	1	0	0
1	2	0	0	0	0	0	0	0	0	0	1	0	0	0	2	5	1	298	0	0
21	4	1	0	0	0	0	0	0	0	0	0	0	0	2	13	5	1	6	198	0

### 3. Results based on Maximum Likelihood Estimator

#### 3.1. Training Data on Maximum Likelihood Estimator

Overall Accuracy = 0.9890851007187861

Class Accuracy:

Group 1 : 0.9958333333333333

Group 2 : 0.9759036144578314

Group 3 : 0.9895104895104895

Group 4 : 0.9846678023850085

Group 5 : 0.9878260869565217

Group 6 : 0.9797297297297297

Group 7 : 0.9914089347079038

Group 8 : 0.9864864864864865

Group 9 : 0.9899328859060402

Group 10 : 0.9949494949494949

Group 11 : 0.9882943143812709

Group 12 : 1.0

Group 13 : 0.9864636209813875

Group 14 : 0.9949494949494949

Group 15 : 0.9949409780775716

Group 16 : 0.9849749582637729

Group 17 : 0.9963302752293578

Group 18 : 0.9911347517730497

Group 19 : 0.9870689655172413

Group 20 : 0.9787234042553191

Confusion Matrix:

478	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
0	567	3	5	1	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	4	566	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	2	0	578	2	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	1	568	0	1	0	1	0	0	1	0	1	0	1	0	0	0	0	0
0	6	3	0	0	580	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0
0	0	0	1	0	1	577	1	1	0	0	0	1	0	0	0	0	0	0	0	0
0	0	0	1	1	0	3	584	2	1	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	1	0	3	0	590	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	591	2	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	1	2	0	1	591	1	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	594	0	0	0	0	0	0	0	0	0
0	1	0	2	2	0	2	0	0	0	0	0	583	1	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	2	591	0	0	0	0	0	0	0

0	1	0	1	0	0	0	1	0	0	0	0	0	0	590	0	0	0	0	0
2	0	0	1	0	0	0	0	1	0	0	0	0	0	590	1	0	1	3	
0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	543	0	0	0
0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2	0	559	1	0
1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	458	1
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	368

### 3.2. Test Data on Maximum Likelihood Estimator

Overall Accuracy = 0.09487008660892739

Class Accuracy:

Group 1 : 0.0440251572327044  
 Group 2 : 0.02570694087403599  
 Group 3 : 0.043478260869565216  
 Group 4 : 0.24744897959183673  
 Group 5 : 0.15926892950391644  
 Group 6 : 0.02564102564102564  
 Group 7 : 0.3089005235602094  
 Group 8 : 0.08607594936708861  
 Group 9 : 0.15365239294710328  
 Group 10 : 0.15365239294710328  
 Group 11 : 0.13784461152882205  
 Group 12 : 0.15949367088607594  
 Group 13 : 0.05089058524173028  
 Group 14 : 0.01272264631043257  
 Group 15 : 0.02295918367346939  
 Group 16 : 0.04020100502512563  
 Group 17 : 0.08516483516483517  
 Group 18 : 0.010638297872340425  
 Group 19 : 0.01935483870967742  
 Group 20 : 0.0796812749003984

Confusion Matrix:

14	0	2	57	54	0	11	20	44	20	4	14	38	1	2	2	13	1	0	21
5	10	5	118	99	19	37	22	15	10	1	4	29	0	2	3	1	0	0	9
6	8	17	136	94	43	8	14	16	18	1	12	15	1	1	0	0	0	0	1
5	3	8	97	163	11	18	26	23	5	2	5	20	1	0	0	2	0	1	2

3 1 2 193 61 4 16 24 19 7 4 3 34 1 1 0 5 0 2 3  
2 20 14 124 98 10 28 17 13 9 1 4 43 1 0 0 0 0 0 6  
1 3 7 101 63 7 118 19 17 12 7 5 18 1 0 1 0 0 2 0  
6 1 0 109 82 5 9 34 39 30 8 12 41 0 1 2 5 0 3 8  
2 0 0 96 71 2 6 40 61 41 15 13 14 2 1 1 5 0 6 21  
9 1 2 59 40 1 7 31 46 61 61 12 43 0 0 0 4 0 1 19  
3 0 0 41 35 0 9 28 46 131 55 9 21 0 0 0 5 0 1 15  
2 3 0 98 42 7 14 22 44 11 6 63 66 0 1 1 4 0 2 9  
3 4 2 119 105 10 15 31 21 19 6 19 20 2 3 3 3 0 0 8  
14 1 2 95 71 3 31 52 41 10 5 11 38 5 0 2 5 0 1 6  
5 2 6 80 80 7 21 21 44 28 5 17 46 3 9 5 6 0 1 6  
27 2 1 60 77 2 13 26 38 14 4 9 69 2 0 16 2 0 1 35  
9 0 1 90 60 3 11 21 36 31 8 13 26 1 0 1 31 0 11 11  
6 1 1 82 63 3 38 26 60 18 6 11 42 1 0 1 4 4 5 4  
9 0 1 82 61 0 16 22 26 12 1 7 25 0 0 3 33 0 6 6  
30 0 0 38 37 1 3 11 25 15 2 11 32 0 1 4 18 0 3 20